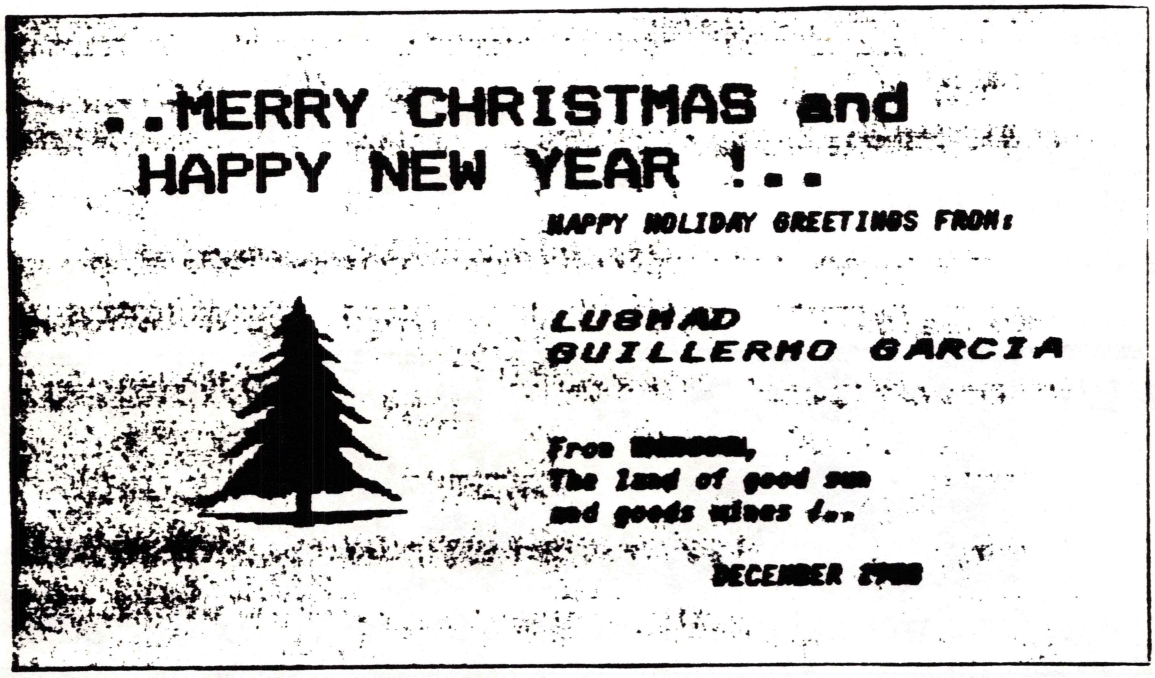
```
**************************************************************
*                                                            *
*          QQQQQQQQ      ZZZZZZZZZ    XX      XX           *
*         QQQQQQQQQQ     ZZZZZZZZ      XX    XX            *
*         QQ      QQ           ZZ       XX XX              *
*         QQ      QQ          ZZ          XXX               *
*         QQ      QQ         ZZ           XXX               *
*         QQ    QQ QQ       ZZ           XX XX              *
*         QQQQQQQQQQ      ZZZZZZZZ      XX   XX            *
*          QQQQQQQQ      ZZZZZZZZZ    XX      XX           *
*                QQ                                          *
*                                                            *
**************************************************************
```

The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88
Alex. F. Burr, K5XY, Publisher
2025 O'Donnell Drive
Las Cruces, New Mexico
88001

Volume 7 Number 2 ($1.50 / issue) 1989 January

* EDITOR'S NOTES	K5XY
* TS1000 TAPE UNLOCKER	T M WARD
* MIDI	LU8MAD
* PARALLEL (II)	LU8MAD
* QL'n PACKET UPDATE	KV3Q
* HK-21 PACKET TNC FIX	K2MI
* mtv_term	KV3Q
* UNCLASSIFIED ADS	



EDITOR'S NOTES
K5XY

Nobody took me up on my offer of a Canadian dollar bill made in the last issue, so I will repeat it here and open it up to anybody who thinks they can use it. For some time now I have had a Canadian dollar bill because the local banks will charge me more to change it then they will give me for it. Therefore I will send it to the first reader who sends me a SASE. The losers in this race will get their envelopes back with the next issue of QZX in them. If they are from Canada, they might also get a Canadian stamp or two taken from SASE's sent earlier. The local post office is even more particular than the banks.

I am glad to have an article for this issue from K2MI, the founder of QZX. He gives a cure to a problem which developed in a packet TNC which he reviewed for us earlier.

TS1000 TAPE UNLOCKER
Tim L. Ward

Here is a short program which will permit you to make backup tapes of non-standard beginnings or ends.

First, type in this very short POKE routine:

```
10 REM 012345678
20 FOR X=16514 TO 16522
30 INPUT A
40 POKE X,A
```

Then RUN this short program entering the following nine numbers when the program pauses for them in line 30. 62,0,50,0,64,1,55,0,201. After the numbers have been entered line 10 should look as shown below:

```
10 REM Y M RND  R TAN
```

Now add the rest of the program

```
20 REM TAPE LOCKER PUBLIC DOMAIN
       LIBRARY OT TIM WARD
30 SCROLL
40 PRINT "INPUT PROGRAM NAME"
50 INPUT N$
60 POKE 16520, CODE N$(LEN N$)
70 LOAD N$( TO LEN N$-1)+CHR$
       USR 16514
80 REM NO MORE WORRY ABOUT TAPES
 THAT  WON'T LET YOU MAKE COPIES   OR
LISTINGS
90 STOP
100 SAVE "UNLOCK"
110 LIST
```

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MIDI

SUCH AS BIG PC TS1000 GOING TO WORLD OF MUSIC

BY LUBMAD

MIDI (MUSICAL INSTRUMENTS DIGITAL INTERFACE) IS A COLLECTION OF PROTOCOLS FOR COMMUNICATION OF DATA AND MUSICAL CHARACTERISTICAL.
MIDI PERMIT THAN YOU CAN LINK SEVERAL MUSICAL DEVICES (SUCH AS SYNTHESIZER, POLYPHONICS KEYBOARDS, etc.) BETWEEN THEY AND WITH THE COMPUTER, REGARDLESS OF MANUFACTURER.
COMBINE A TS1000 AND SOME INSTRUMENTS AND YOU CAN HAVE WHAT IS VIRTUALLY A PROGRAMABLE ORCHESTRA.
MIDI USE 31250 BITS/SEC THAT IS MORE GREAT THAT BAUD RATE OF COMMON RS232 SERIAL INTERFACES.
A GREAT ADVANTAGE IS THAT MIDI IS FULLY ISOLATED BETWEEN DEVICES.
TRANSMISSION IS MAKE ACROSS OPTO COUPLERS TO AVOID HUM OF LINK BY RETURN OF GROUND, AN USUAL PROBLEM WHEN WORKING WITH AUDIO.

HOW WORK MIDI?

SINCE ACEPTATION OF MIDI PROTOCOL, STANDARDIZATION OF MUSICAL PARAMETERS WAS EASY.
TO PLAY A KEY-NOTE, IN MIDI LANGUAGE, THE FOLLOWING CODES AND STEEP OF PROGRAMATION ARE USED:
A COMMAND OF 3 BYTES "KEY ON" IS SENT AS INDICATIVE OF BEGIN THE NOTE, ALSO DEFINE MIDI CHANNEL.
THE "KEY NUMBER" CODE IS THE POSITION OF TONE INTO A VIRTUAL KEY-BOARD WITH KEYS FROM 0 TO 127 (LOW FREQUENCY TO HIGH FREQUENCY TONE).
"VELOCITY" CODE, IS A CODE REFERABLE TO DYNAMICS OF KEY-TONE.
THE "KEY OFF", IS A COMMAND OF 3 BYTES (END OF NOTE). IN MIDI NO DEFINITION OF NOTE LENGTH IS MADE. NOTE LENGHT IS FOUNDED BY DELAY BETWEEN KEY ON AND KEY OFF.
EVEN SO, EXIST A DECODER SYTEM THAT CONTROL A REAL TIME CLOCK TO SYNCHRONIZE MIDI DATA (SUCH AS A "MIDI METRONOME") NAMED "MIDI REAL TIME DATA". EVERY NOW AND THEN IS NEED SOME TIME FUNCTION.
TABLES 1, 2 AND 3, FROM YAMAHA DX7, ARE ILLUSTRATIVES OF MIDI. THE 8 BITS INSTRUCTIONS PROVIDES ALL COMMUNICATION POSSIBILITY OF THE SYNTHESIZER VIA MIDI.

DO YOU HAVE NU4V SERIAL INTERFACE?

YOU CAN MAKE A EXPERIMENTAL MIDI INTERFACE, WITH MINOR MODIFICATIONS INTO NU4V SERIAL INTERFACE THAT YOU USE FOR RTTY WORK, WITHOUT LOSS OF WRAP CAPABILITY, ONLY YOU NEED AN EXTERNAL 2MHzCLOK.
AFTER YOU NEED TO DIVIDE 2MHzBY 4 (DIVISOR USED TO GENERATE 16 x CLOCK) UNDER SOFTWARE CONTROL.
THE NEXT STEEP IS ADDITION OF AN OPTO COUPLER, AND THE MIDI FULLY "STANDARD" CONNECTORS (THE COMMON DIN CONNECTORS).

CAUTION:

PIN 2 OF IN CONNECTOR IS NOT GROUNDED ...

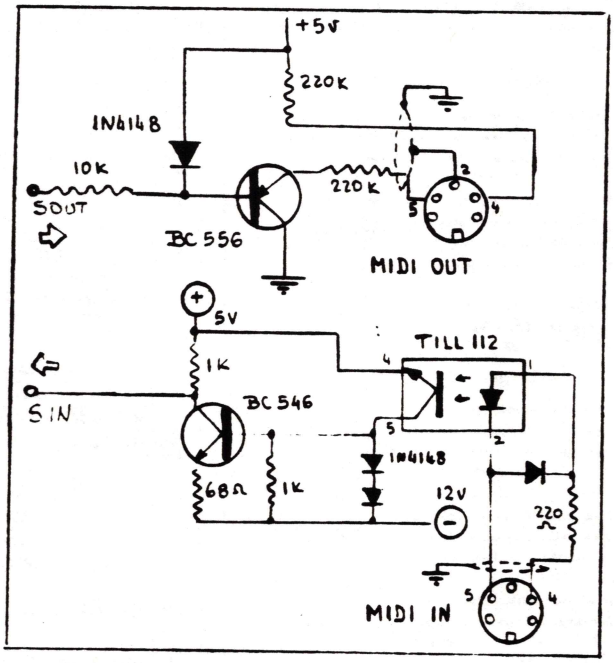
ENDING:

WELL, NOW YOU MUST WRITE THE SOFTWARE...AND GOOD MUSIC!
THE NATIONAL SEMICONDUCTOR INS8250A DATA SHEETS IS VERY HELPFUL FOR YOUR SOFTWARE DEVELOPMENT.
THE ADAPTATION OF NU4V SERIAL INTERFACE TO MIDI INTERFACE IS THE STARTER POINT. A FULLY OPERATIONAL SYSTEM REQUIRE ENOUGH TIME AND EXPERIMENTATION, THEN PATIENCE, AND MORE PATIENCE.

BIBLIOGRAPHY:

MIDI PROJECTS,
ELECTRONICS TECNOLOGY TODAY INC, POBOX 240,
MASSAPEQUA PARK, NY 11762-0240, USA.

73'S, GUILLERMO (LUBMAD)



DX7 → MIDI ①

TRANSMISSION DATA.

Channel information

1001nnnn Key ON & Channel number (n=0; ch1)
0kkkkkkk Key number (k=36; C_1) – (k=96; C_6)
0vvvvvvv Key velocity (v=0, Key OFF)
(v=1; ppp) – (v=127; fff)

1011nnnn Control change & Channel number
(n=0, ch1)
0ccccccc Control number
0vvvvvvv Control value

C	Parameter	V
1	Modulation wheel	0 – 127
2	Breath controller	0 – 127
4	Foot controller	0 – 127
6	Data entry knob	0 – 127
64	Sustain foot switch	0 : OFF, 127 : ON
65	Portamento foot switch	0 : OFF, 127 : ON
96	Data entry +1	127 : ON only
97	Data entry –1	127 : ON only

1100nnnn Program change & Channel number
(n=0 , ch1)
0ppppppp Program number (p=0; INT1) – (p=31; INT32),
(p=32; CRT1) – (p=63; CRT32)
1101nnnn After touch & channel number
(n=0:ch1)
0vvvvvvv Touch value (0 – 127)
1110nnnn Pitch bender & Channel number (n=0 ; ch1)
0vvvvvvv Pitch bender value LS byte
0vvvvvvv Pitch bender value MS byte (v = 64 – 127)

MS byte	LS byte
0 – 64	0
65 – 127	2 (MS byte – 64)

System exclusive information

MIDI active sensing

11111110 Status byte

MIDI active sensing is continuously output at 80 ms intervals, except during bulk dump data transmission and reception.

Bulk data for one voice

11110000 Status byte
0iiiiiii Identification number (i=67, YAMAHA)
0sssnnnn Sub status (s=0) & Channel number
(n=0 ; ch1)
0fffffff Format number (f=0 ; 1 voice)
0bbbbbbb Byte count MS byte (b=155 ; 1 voice)
0bbbbbbb Byte count LS byte
0ddddddd Data 1st byte
0ddddddd Data 155th byte
0eeeeeee Check Sum
11110111 EOX

Bulk data for 32 voices

11110000 Status byte
0iiiiiii Identification number (i=67 , YAMAHA)
0sssnnnn Sub status (s=0) & Channel number
(n=0 , ch1)
0fffffff Format number (f=9 , 32 voices)
0bbbbbbb Byte count MS byte (b=4096 , 32 voices)
0bbbbbbb Byte count LS byte
0ddddddd Data 1st byte
0ddddddd Data 4096th byte
0eeeeeee Check Sum (2'S complement of the sum of 4096 bytes)
11110111 EOX

Parameter change

11110000 Status byte
0iiiiiii Identification number (i=67 , YAMAHA)
0sssnnnn Sub status (s=1) & Channel number
(n=0 ; ch1)
0gggggpp Parameter group number (g=0 ; Common DX Voice parameter), (g=2; DX7 Function parameter)
0ppppppp Parameter number
0ddddddd Data
11110111 EOX

DX7 → MIDI → DX7 ②

g=0 : Common DX Voice parameter

P	Parameter	d
0	OP6 EG RATE 1	0 – 99
1	" RATE 2	"
2	" RATE 3	"
3	" RATE 4	"
4	" LEVEL 1	"
5	" LEVEL 2	"
6	" LEVEL 3	"
7	" LEVEL 4	"
8	OP6 KEY BOARD LEVEL SCALE BREAK POINT	"
9	" LEFT DEPTH	"
10	" RIGHT DEPTH	"
11	" LEFT CURVE	0 – 3
12	" RIGHT CURVE	"
13	OP6 KEY BOARD RATE SCALING	0 – 7
14	OP6 MOD SENSITIVITY AMPLITUDE	0 – 3
15	OP6 OPERATOR KEY VELOCITY SENSITIVITY	0 – 7
16	OP6 OPERATOR OUTPUT LEVEL	0 – 99
17	OP6 OSCILLATOR MODE	0 – 1
18	OP6 OSCILLATOR FREQUENCY COARSE	0 – 31
19	" FINE	0 – 99
20	DETUNE	0 – 14
21		
	OP5 ~ OP1	
125		
126	PITCH EG RATE 1	0 – 99
127	" RATE 2	"
128	" RATE 3	"
129	" RATE 4	"
130	" LEVEL 1	"
131	" LEVEL 2	"
132	" LEVEL 3	"
133	" LEVEL 4	"
134	ALGORITHM SELECT	0 – 31
135	FEED BACK	0 – 7
136	OSCILLATOR SYNC	0 – 1
137	LFO SPEED	0 – 99
138	" DELAY	"
139	" PMD	"
140	" AMD	"
141	LFO SYNC	0 – 1
142	" WAVE	0 – 4
143	MOD SENSITIVITY PITCH	0 – 7
144	TRANSPOSE	0 – 48
145	VOICE NAME 1	ASCII
154	VOICE NAME 10	ASCII
155	OPERATOR ON/OFF (D_6 D_5 D_4 D_3 D_2 D_1 D_0)	
	0=OFF, 1=ON (0 OP1 OP2 OP3 OP4 OP5 OP6)	

g=2 ; DX7 Function parameter

P	Parameter	d
64	MONO/POLY MODE CHANGE	0 – 1
65	PITCH BEND RANGE	0 – 12
66	" STEP	0 – 12
67	PORTAMENT MODE	0 – 1
68	" GLISSAND	0 – 1
69	" TIME	0 – 99
70	MODULATION WHEEL RANGE	0 – 99
71	" ASSIGN	0 – 7
72	FOOT CONTROLLER RANGE	0 – 99
73	" ASSIGN	0 – 7
74	BREATH CONTROLLER RANGE	0 – 99
75	" ASSIGN	0 – 7
76	AFTER TOUCH RANGE	0 – 99
77	" ASSIGN	0 – 7

MIDI → DX7 ③

RECEPTION DATA

Channel information

1000nnnn Key OFF & Channel number
(n=0 ; ch1) – (n=15 ; ch16)
0kkkkkkk Key number (k=0, 1 ; C^{-2}) – (k=127 ; G_8)
0vvvvvvv Key velocity (v : ignored)

1001nnnn Key ON & Channel number
(n=0 , ch1) – (n=15 , ch16)
0kkkkkkk Key number (k=0, 1 ; C^{-2}) – (k=127 ; G_8)
0vvvvvvv Key velocity
(v=0 Key OFF), (v=1 , ppp) – (v=127 , fff)

1011nnnn Control change & channel number
(n=0 ; ch1) – (n=15 ; ch16)
0ccccccc Control number
0vvvvvvv Control value

c	Parameter	v
1	Modulation wheel	0 – 127
2	Breath controller	0 – 127
4	Foot controller	0 – 127
5	Portamento time	0 – 127
6	Data entry knob (MASTER TUNE only)	0 – 127
7	Volume (Lowest 4 bits ignored)	0 – 127
64	Sustain foot switch	0 : OFF, 127 : ON
65	Portamento foot switch	0 : OFF, 127 : ON
96	Data entry +1	127 : ON only
97	Data entry –1	127 : ON only
124	Omni all off	ignored
126	MONO all key off	1
127	POLY all key off	ignored

1100nnnn Program change & Channel number
(n=0 ; ch1) – (n=15 ; ch16)
0ppppppp Program number (p=0, INT1) – (p=31, INT32)
(p=32, CRT1) – (p=63, CRT32)
1110nnnn Pitch bender & Channel number
(n=0 , ch1) – (n=15 ; ch16)
0vvvvvvv Pitch bender value LS byte (Ignored)
0vvvvvvv Pitch bender value MS byte (0 – 64 – 127)

System exclusive information

Bulk data for one performance memory

11110000 Status
0iiiiiii Identification number
(i=67, YAMAHA)
0sssnnnn Sub status (s=0) & channel number
(n=0,ch1) – (n=15,ch16)
0fffffff Format number (f=2 1 performance)
0bbbbbbb Byte count MS byte (b=94,1 performance)
0bbbbbbb Byte count LS byte
0ddddddd Data 1st byte
0ddddddd Data 94th byte
0eeeeeee Check sum (2's complement of the sum of
11110111 EOX

MIDI instructions in YAMAHA DX7

PARALLEL (II)

LUBMAD

PLEASE NOTE THESE CORRECTIONS TO THE PART I:

THERE ARE TWO ERRORS IN SCHEMATICS: THE UPPER RIGHT IC is 74LS123 (NOT 74LS132), PIN 15 IN UPPER SIDE OF 74LS123, BETWEEN PINS 11 AND 4, IS PIN 16.

ALSO DELETE LINES 30, 80, 90 AND 100 IN BASIC LIST OF PROGRAM.

I APOLOGIZE FOR ANY INCONVENIENCE CAUSED BY THESE MISTAKES.

SUCCESSFUL JUNCTION

LATTERLY I HAVE MADE FOR MY FRIEND Edy (LU1MFC) ONE OF THIS PARALLEL INTERFACE FOR USE WITH A COMMODORE MPS1250 (CITIZEN) PINTER (9X9 DOT MATRIX, 120CPS, BIDIRECTIONAL),

NOW HE HAVE EPSON STANDARD, EPSON GRAPHICS AND IBM GRAPHICS PRINTER CAPABILITY WITH HIS TKB5 COMPUTER (SIMILAR TS1000 - SEE REVIEW IN QZX JULY 85).

YOU CAN SEE IN FIGURE 1, SOME PRINTOUT EXAMPLES WRITTEN WITH MPS1250 PRINTER.

THIS ARTICLE WAS FORMATTED AND PRINTED USING MY PROGRAM AND PARALLEL INTERFACE WITH COMMODORE MPS1250 PRINTER. THE LISTING FOLLOWS ON THE NEXT CONVENIENT PAGE.

WELL.., I HOPE THAT SANTA IN NEXT CHRISTMAS, REMEMBER TO LUBMAD...

(I WANT TO REPLACE MY OLD SEIKOSHA PRINTER, Hi...Hi..) 73 FROM LUBMAD

DEMO OF MPS1250 PRINTER WITH PARALLEL INTERFACE AND TS1000
DEMO OF MPS1250 PRINTER WITH PARALLEL INTERFACE AND TS1000
DEMO OF MPS1250 PRINTER WITH PARALLEL INTERFACE AND TS1000
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Demo of MPS1250 printer wit
Demo of MPS1250

QL'n PACKET UPDATE

KV3Q, Bob Diggs

Here I am again reporting on my Packet experience, but this time it's from our Sailboat in sunny Florida where us old codgers go to escape the winter chills. I changed my mind at the last minute and installed the QL instead of the T/S 1000 as planned and reported in October "Friends of QZX". I might have been able to bring the monitor, but we were running short of time and I didn't get a chance to check if there was room for it. I did find a place to store the printer while we were underway. Incidently, we were 35 days, traveled 1466 miles, mostly under power, stopped to visit friends along the way, and had a wonderful trip.

My packet set up now is the QL, CITIZEN 120D printer, MFJ-1270B TNC, Icom 2AT, and the marine VHF antenna at the top of the mast (about 48 feet). It is a gain antenna and seems to do OK. I did not bring my amplifier for the HT, however, so it is barefoot.

The first time few times on the air, I used a black and white TV which was not very satisfactory. It wwas OK for packet but lousy for the QL programs. So, I swapped the B&W for the ship's color tv. I soon discovered mode 8 was better than 4. The result was a new program which I call "mtvterm" because it can be used on either a monitor or a tv in either mode 4 or 8.

I have learned that I have less trouble with bulletin boards if I send one line at a time instead of <enter> at end of the message.

Maybe some of the QL fans are still using or have some occasion to use TV, so I thought I would send it in. Same problems as reported before, but MIKE_TERM is still my favorite packet program for the QL.

46 Magic Circle Drive
Goshen, NY 10924
December 18th, 1988

SUBJECT: HK-21 "(ERROR)" Fix

TO: Alex Burr, K5XY
Bob Howard, WA6DLI

Seasons's greetings to you and yours!

My "Christmas present" is to have my HK-21 working again...and it didn't cost a penny to fix it. I thought you gentlemen might be interested in how I used the "Armstrong" method to fix it.

I'm sending each of you copies of my letter to Heath, and a bulletin I sent to several local packet bulletin boards.

in the HK-21. This is very similar to problems I had with my Toshiba T-1100 laptop, and draining it completely fixed it. It has now run for four months with no problems at all (I am using it to write this letter). For some reason Toshiba products seem to have a creeping problem that gets steadily worse, but can be cured by completely draining the system.

Anyway, gentlemen, here are my experience factors with the HK-21. Overall, I still like it, and it is on the air 24 hours a day as K2MI-3 BBS on 145.570. This is sort of an unusual BBS, because I specialize in ARRL bulletins and information of interest to many people, whereas personal messages are normally left on other BBS's in the area. Based on the number of check-ins to K2MI-3, there is a great deal of interest in reading the ARRL bulletins!

Again, holiday greetings to you and yours and to all the QZX'ers!

MARTY IRONS, K2MI

46 Magic Circle Drive
Goshen, NY 10924
November 30th, 1988

SUBJECT: Fix for HK-21 "Pocket Packet" BBS

TO: Heath Company, ATTN: Amateur Radio Technical Assistance
P. O. Box 8589
Benton Harbor, MI 49022

Last April I purchased HK-21 #301572, and put it on the air as a local bulletin board. All went well for a few months, then certain users got "(ERROR)" messages when entering valid commands. Then others started getting "(ERROR)", and some users got "(ERROR)" on all commands. The situation frustrated users to the point where they were really giving me a hard time about it.

I called your tech support in northern New Jersey. They had never heard of the problem and had no suggestions, so I called Benton Harbor. The techrep there had not heard of the problem, and his only suggestion was that it might be a weak signal condition.

The situation continued to worsen until I had to take it off the air because it would not accept any valid commands, returning "(ERROR)" for everything (including the Bye command).

Three days ago I downloaded all files from it to disk (the SYSOP function still worked), opened it up, removed the jumper to the lithium battery, thereby draining the memory. Then I uploaded all the files, and it has worked perfectly ever since.

So, if anyone else experiences the "creeping (ERROR)" problem that keeps getting worse, tell them to try (1) save files, (2) remove the jumper and drain the system, and (3) restore the files.

It worked for me, so I wanted to pass my experience on to others through your technical assistance department.

How did I know that this would cure the problem? I didn't, but when I opened it up and saw "Toshiba" on a lot of parts, I merely tried the same fix that fixed my Toshiba T-1100 laptop computer when it started restricting access to valid DOS commands until it wouldn't work at all. (You might want to talk to Toshiba about this, too).

I'm very pleased to have K2MI-3 BBS back in service, and so are other local users. It's a nice little unit (except for this one quirk).

Seasons greetings to all your staff!

Goshen, NY, Nov 29th

The Heath "Pocket Packet" model HK-21 is a really neat pocket-sized TNC with built-in 16K bulletin board.

After a few months of use my BBS started giving "(ERROR)" returns when valid commands were entered by users. The situation slowly got worse, with more and more users complaining (and rightly so) that they could not use my BBS.

The problem was probably a stray static charge that messed up its command functions. The cure was quite simple:

(1) Download all files and save them.
(2) Remove the three screws and carefully open up the back section.
(3) Remove the small jumper right behind the lithium backup battery. This drains the memory. Leave it off for a few minutes, then put it back on.
(4) Upload the files.

It should now work normally. Anyway, mine did.

Please let me know if you have experienced any other oddities with your HK-21, and how they were overcome.

Season's greetings to all!

Marty Irons, K2MI

mtv_term
KV3Q, Bob Diggs

```
1 REMark 300/1200 baud terminal
2 REMark From MIKE_TERM, printed in
         April issue of QZX
3 REMark According to Peter Hale,
         Boston Computer Society
4 REMark Mike Mitchell adapted it
5 REMark from QUANTA software library
         called terminal_bas.
6 REMark The minimal bell(beep) is to
         avoid
7 REMark having to type "over to you."
8 REMark Adapted for tv in mode 4 or
         8 by
9 REMark KV3Q, Bob Diggs
10 REMark 89 Riverside Drive
11 REMark North East, MD 21901
50 PRINT#0,"Choose screen: Monitor=m,
TV=t"
60 IF INKEY$(-1)=="m"THEN GO TO 100:EL
SE GO TO 70
70 WINDOW 425,160,45,0
75 BORDER 1,0,7: lb=127
80 PRINT#0,"Choose mode, enter 4 or 8"
85 CLS:INPUT a
90 MODE a:GO TO 110
100 WINDOW 465,204,6,0
105 BORDER 1,0,7: lb=127
110 CLS: POKE 163976,255: CLS#0
120  PRINT#0,"Choose Baud:   H=1200, L
=300"
130 IF INKEY$(-1)=="h"THEN BAUD  1200:
ELSE BAUD 300
140 CLS#0: OPEN#5,ser2i
150     PRINT#0,"   F5=Quit"!!!"ALT^C=
^C","^G=BEL"
160 REPeat term
170 terminal: PRINT#0,,"Exit?(y/n)"
180  IF INKEY$(-1)=="Y" THEN EXIT term
190 END REPeat term
200 CLOSE#5
205 PRINT#0,,'Re-run/Quit? (r/q)'
210  IF INKEY$(-1)=="R" THEN RUN: ELSE
 STOP
220 DEFine PROCedure terminal
230 REPeat key_loop
240   a=CODE(INKEY$(#5,0))&&lb
250    IF a=13 THEN PRINT
260    IF a=7 THEN BEEP 2000,15
270    IF a>31 THEN PRINT CHR$(a);
280   b=CODE(INKEY$)
290    IF b=248 THEN EXIT key_loop
300    IF b=255 THEN b=0
310    IF b=0 THEN NEXT key_loop
320    IF b=10 THEN b=13
330    IF b=208 THEN b=7
340   PRINT#5, CHR$(b);
350  END REPeat key_loop
360 RETurn
370 END DEFine terminal
```

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: Book Easy-up Antennas for Radio Listeners and Hams by Edward Noll. Paperback (1988) 162 pages. Originally $16.95, now $11.00 postpaid in the US. A Sams publication. The title says it all. Alex. F. Burr, K5XY, 2025 O'Donnell, Las Cruces, NM 88001.

QZX Discount: 15% discount on all orders mentioning QZX. T & C Services (address in ad this issue.)

FOR SALE: Book ZX81 BASIC Book by Robin Norman. Paperback 190 pages. Originally $12.95 now $6.00 postpaid in US. Simple and clear introduction to ZX81 BASIC. Alex. F. Burr, K5XY, 2025 O'Donnell, Las Cruces, NM 88001.

WANTED: Good Readable schematic for T/S1500. Edward L. Radtke, 1602 Woodluck Ave., Louisville, KY 40205.

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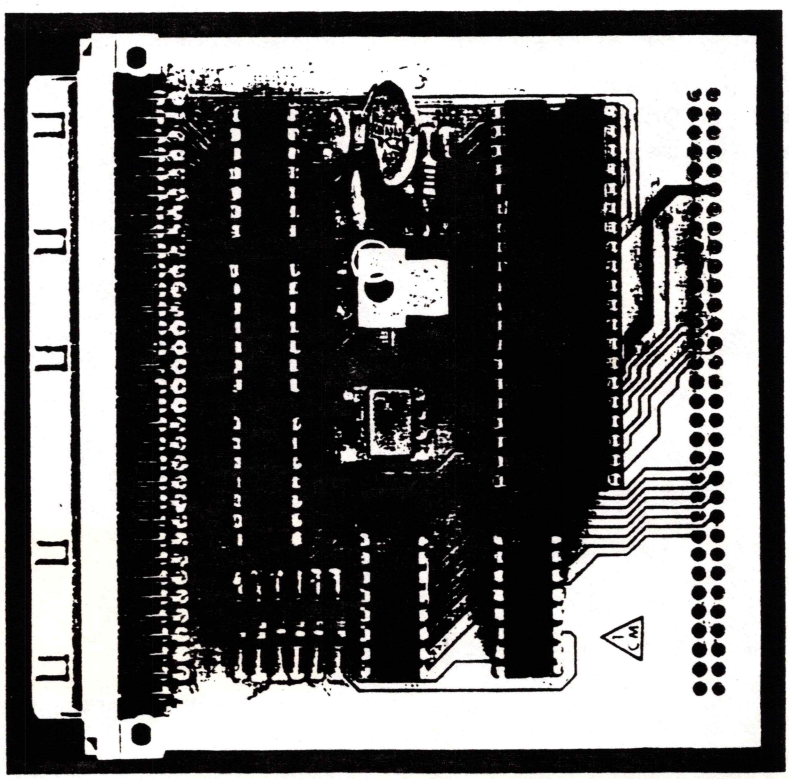
COMPLETE EASY-TO-FOLLOW INSTRUCTIONS



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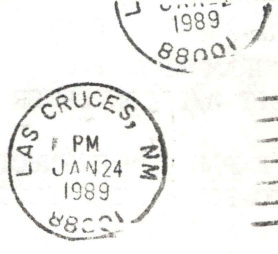

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